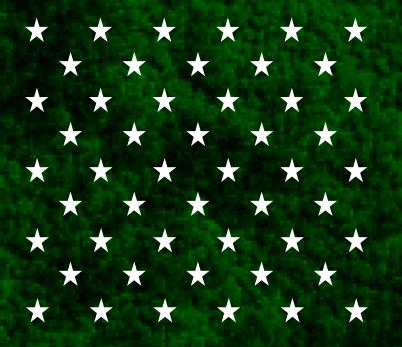


Emergency
Management
Program
Follow-up Review_
at the

Oak Ridge National Laboratory



October 1999

Office of
Independent
Oversight and
Performance

Assurance

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Abbreviations Used in This Report

Emergency Action Level
Emergency Management Working Group
Emergency Plan Implementing Procedure
Laboratory Shift Superintendent
Oak Ridge National Laboratory
DOE Oak Ridge Operations Office

U.S. Department of Energy

DOE

Executive Summary

EVALUATION: Independent Oversight

Follow-up Review of the ORNL

Emergency Management

Program

SITE: Oak Ridge National Laboratory

DATE: October 1999

Scope

The U.S. Department of Energy (DOE) Office of Emergency Management Oversight, within the Office of Independent Oversight and Performance Assurance, conducted a follow-up review of the emergency management program at the Oak Ridge National Laboratory (ORNL) to determine the status of actions taken to correct deficiencies identified during the evaluation of the ORNL emergency management program in April and May of 1998. The review focused on a sample of ORNL corrective actions currently in place to address program elements previously identified as needing significant management attention and being tracked in the Department's Corrective Action Tracking System. The review also addressed new Oak Ridge Reservation-wide initiatives and programmatic changes at the DOE Oak Ridge Operations Office (OR) to assess their effects on the Reservation-wide emergency management program. Additionally, the review was designed to provide insights into line management processes at OR and ORNL, which provide feedback and continuous improvement as defined by the Department's policy of integrated safety management.

Background

ORNL is one of several sites that were evaluated as part of a Secretary of Energy directive to perform an independent review of the status of emergency management programs within the DOE complex in 1998. That evaluation found

ORNL to have effective program elements in facilities and equipment, initial response capabilities, notification and reporting, and consequence assessment capabilities. However, at that time OR and ORNL had not implemented an effective emergency management program to address significant weaknesses in hazards assessments, emergency action levels (EALs), classification, protective actions, emergency procedures, training, implementation of the Oak Ridge Reservation Emergency Plan, feedback mechanisms, and drills. During the April and May 1998 review, OR and ORNL were formulating a transition to a Reservation-wide emergency plan concept for all three major sites and operating contractors. However, the transition was not completed, and the April 1998 approved Reservation-wide emergency plan was not fully implemented.

Upon her appointment in the spring of 1999, the new OR Manager took rapid action to renew the commitment to a Reservation-wide emergency plan and to establish a framework to achieve compliance with the DOE emergency management requirements. Subsequently, other internal and external reviews, including concerns expressed by the Defense Nuclear Facilities Safety Board about progress in addressing the results of the 1998 Independent Oversight review, served to point out again that the Oak Ridge Reservation did not have an effective emergency management program and had been slow to implement corrective actions.

Results

This review found that until the last few months, progress in improving emergency management was very slow. The new OR Manager has refocused Reservation-wide actions for improving emergency management and accelerated the existing schedules for completing site-specific corrective actions at all Oak Ridge Reservation sites, including ORNL. This review found a clear commitment to a Reservation-wide emergency plan among both DOE and contractor management. This management commitment is the driving force toward program improvements at ORNL.

One of the major management actions taken was the establishment of an OR Emergency Management Working Group. Membership includes Federal staff from the three major Reservation sites and the OR Emergency Management Program Office. The group has been given the necessary authority and access to the OR Manager and Deputy Manager to ensure implementation of actions and accountability by line management. The rapid pace of activities since July 1999 reflects a commitment to improvement while also highlighting the many challenges that remain to transition from three site programs to a single DOE program.

The DOE ORNL Site Manager has also shown strong support and has been helpful in coordinating efforts among the DOE Office of Science, the DOE Office of Environmental Management, and ORNL to initiate rapid improvements in emergency management at ORNL. The Independent Oversight team found that Lockheed Martin Energy Research and Bechtel-Jacobs Company management have accepted the responsibility for making the required improvements at ORNL and have been able to accomplish many of the required actions on time. The necessary funding priorities have been established to enable the ORNL facility hazards surveys and hazards assessments to be completed and maintained. This reallocation of funding took cooperation among the DOE Office of Science, the DOE Office of Environmental Management, OR, and ORNL to address the historic uncertainty of Headquarters responsibility for emergency management at this multi-program laboratory.

However, significant concerns remain, and some emergency management program elements do not meet Departmental requirements. The foundation of an effective program based on hazards surveys and hazards assessments is not yet established. Initial efforts, which are pending a comprehensive DOE review and approval process, need to better reflect requirements and guidance, including the potential for transportation-initiated events. OR has established Reservation-wide expectations and requirements in several areas through the issuance of emergency plan implementing procedures, but these procedures have yet to be accepted and utilized at ORNL. The lack of

clarity regarding the usage of these Reservation-wide procedures represents a significant weakness that warrants immediate management attention. Furthermore, a disciplined approach in developing and using procedures—necessary for an effective response to a significant event—is still lacking. The ORNL corrective actions related to procedure quality and use have not been effective in addressing emergency responder performance weaknesses identified during the 1998 review. Training requirements and capabilities are different from a Reservation-wide and individual site perspective. Consequently, training and procedure development will require close coordination and a defined process for sequencing to full implementation. Finally, as noted in 1998, no integrated program of drills and exercises has been established to measure effectiveness, inform management of results, and provide systematic feedback and improvement opportunities.

Conclusions

The enhanced senior management commitment and actions over recent months are driving improvements in the Reservation-wide and ORNL emergency management programs. In the next year, continued leadership of transition planning activities is needed to implement new standards, programs, and procedures to meet established deadlines. In the long term, continuing leadership and sustained momentum are needed to provide further assurance that site workers and the public can be protected following an emergency event or condition. The actions taken over the past few months to develop the Reservation-wide program are improving the ORNL emergency management program. Recent changes are being driven from the senior management level down through the organization but are not yet reflected in performance improvements at the emergency responder level. OR and ORNL management clearly recognize that current systems are neither fully implemented nor compliant with Departmental requirements. Efforts to address these problems, if sustained, can provide reasonable assurance that all of the Department's requirements are met and the site's emergency responders are ready to respond promptly and effectively to an emergency. These findings are in addition to the issues identified during the 1998 ORNL emergency management evaluation, which were consolidated into a single "Legacy Issue" when the Department's Corrective Action Tracking System was established.

In response to the "Legacy Issue" for emergency management, the Office of Science, through delegation of authority to OR, established 19 separate corrective

actions within the Department's Corrective Action Tracking System. All of these existing corrective actions were incomplete at the time of this follow-up review. The existing corrective actions now in the Department's system have not been updated to reflect the exceptions and schedules of the OR Emergency Management Action Plan of August 1999 now being implemented.

FINDINGS

As directed by the Office of the Secretary of Energy, DOE has established a process for recording, tracking, addressing, and resolving findings identified by the Office of Independent Oversight as defined by the *Protocols for Responding to Office of Independent Oversight and Performance Assurance Appraisal Reports* (August 1999). The DOE Office of Science, as the lead program secretarial officer, and the DOE field elements (OR and ORNL site office), as the cognizant line managers, are required to develop a corrective action plan to address the findings identified in this report.

- Line management has not established long-term plans to sustain emergency management program
 effectiveness, including an integrated self-assessment program with clearly defined organizational roles,
 responsibilities, and accountability mechanisms, beyond near-term efforts to achieve compliance with DOE
 Order 151.1 requirements.
- 2. OR and ORNL line management have not identified and implemented the corrective actions necessary to ensure that emergency plan implementing procedures are prepared, verified to be accurate, validated as usable, and used in a disciplined and accurate manner in accordance with DOE Order 151.1.

OPEN LEGACY ISSUE

OR and ORNL have not implemented an effective emergency management program; significant weaknesses are evident in hazards assessments, EALs, classification, protective actions, emergency procedures, training, implementation of the Oak Ridge Reservation Emergency Plan, feedback mechanisms, drills, and field monitoring.

Introduction



The Office of Oversight conducted a follow-up review of the emergency management program at ORNL.

The U.S. Department of Energy (DOE) Office of Emergency Management Oversight, within the Office of Independent Oversight and Performance Assurance, conducted a follow-up review of the emergency management program at the Oak Ridge National Laboratory (ORNL) to determine the status of actions taken to correct deficiencies identified in April and May of 1998. The review focused on a sample of corrective actions related to hazards assessments, procedures, training, and drill and exercise programs. The review also focused on new Oak Ridge Reservation-wide initiatives and programmatic changes at the Oak Ridge Operations Office (OR) to assess their effects on emergency management programs. Additionally, the review was designed to provide insights into line management processes at OR and ORNL, which provide feedback and continuous improvement as defined by integrated safety management.

The DOE Office of Science is the lead program secretarial office for OR. The Office of Laboratory Operations and Environment, Safety, and Health provides leadership and a central corporate focal point for the operations; infrastructure; environment, safety and health; and construction management activities for the Office of Science at ORNL. Responsibilities for environmental restoration and waste management operations reside with the DOE Office of Environmental Management as the cognizant secretarial office at ORNL. OR provides for line management oversight at ORNL through the DOE ORNL Site Office, and supports all Oak Ridge sites through the Emergency Management Program Office. The ORNL multi-program science and technology mission is managed by Lockheed Martin Energy Research Corporation as the management and operating contractor. The Bechtel-Jacobs Company is the management and integrating contractor for environmental management at OR, including activities at ORNL.

ORNL is one of several sites that were evaluated as part of an Independent Oversight review of the status of emergency management within the DOE complex conducted from January to June of 1998. The evaluation was performed at the direction of the Secretary of Energy following a chemical explosion at the Hanford site that highlighted weaknesses in emergency preparedness and response.



The Oak Ridge Emergency Operations Center was recognized as a positive attribute in a 1998 evaluation.

The April and May 1998 evaluation concluded that OR and ORNL management attention was evident in the identification of the need for change and the development of the Reservation-wide emergency plan concept to address current and future program needs. That evaluation found ORNL to have effective program elements in facilities and equipment, initial response capabilities, notification and reporting, and consequence assessment capabilities. The Oak Ridge Emergency Operations Center was recognized as a positive attribute based upon equipment, functionality, and communication capabilities. Positive attributes also included the process for upkeep of security-related memoranda of agreement and the assignment of dedicated personnel to focus on recovery activities and planning throughout an accident response. Good performance was also observed during much of the "Volunteer Response '98" exercise. Weaknesses identified included lack of completion of hazards assessments and the associated emergency action levels (EALs), inadequate rigor in the development and usage of procedures, and lack of a structured training program. Other areas of weakness included the lack of a formal drill and exercise program and the lack of self-assessments of emergency management.

Subsequent to the 1998 evaluation, discussions of emergency management issues at OR and the Y-12 facility with representatives of the Defense Nuclear Facilities Safety Board confirmed the weaknesses identified during past Independent Oversight evaluations and noted slow implementation of needed

corrective actions. In the spring of 1999, a new manager was appointed for OR. In August 1999 she took rapid action to renew the commitment to implementation of a Reservation-wide emergency plan and to establish a framework to achieve compliance with the DOE emergency management requirements.

Results

The evaluation addresses areas encompassed by DOE Order 151.1 requirements, the results of the 1998 complex-wide review of emergency management programs, and existing OR and ORNL corrective actions selected for review. Each section includes key observations, conclusions, and a rating of Satisfactory, Marginal, or Unsatisfactory. These ratings are used to communicate the effectiveness of corrective actions implementation and to provide a perspective on where line management attention is warranted. Appendix B provides a more detailed explanation of the rating system.

Feedback and Continuous Improvement Process



The Oversight team found a renewed commitment to a Reservation-wide emergency plan among management at DOE and ORNL.

During the April and May 1998 review, OR and ORNL were found to have begun a transition to a Reservation-wide emergency plan concept. The transition was not completed, and the April 1998 approved Oak Ridge Reservation Emergency Plan was not fully implemented. During the summer of 1999, OR focused on Reservation-wide actions for improving emergency management and accelerated the schedule for completing sitespecific corrective actions at all Reservation sites, including ORNL. As a result of the actions taken in the last few months by OR senior management, particularly the new OR Manager, the Independent Oversight team found a renewed commitment to a Reservation-wide emergency plan among management at DOE and ORNL. However, some specific concerns continue to be expressed by ORNL management and staff regarding the application of Reservation-wide procedures and requirements at ORNL. In addition, training

requirements and capabilities may be different at some Reservation sites. Consequently, there is still discussion about how to best meld the requirements of a Reservation-wide emergency plan with the needs, organizational differences, and staffing capabilities of each site.



The EMWG has been responsible for bringing about rapid improvements in emergency management at the Oak Ridge Reservation.

One of the major management actions recently taken by OR was the establishment of a DOE Emergency Management Working Group (EMWG). The EMWG has become the focal point for assembling all of the actions required to bring the Reservation into compliance with DOE Order 151.1, as well as implementing the Reservationwide emergency plan. Formed July 22, 1999, the EMWG has since been the main instrument for bringing about rapid improvements in emergency management at the Oak Ridge Reservation. Membership currently includes DOE employees exclusively; however, there are plans to include the major site contractors as soon as DOE policy and internal coordination issues are resolved. Contractors have had direct involvement with developing all chapters of the draft revised Reservation-wide emergency plan and expressed the desire to OR to be part of the EMWG efforts. While the EMWG currently does not have a formal charter, the OR Emergency Management Action Plan has become, in effect, its charter. This action plan was forwarded to senior DOE managers with a letter signed by the OR Manager dated August 20, 1999, along with her clear direction and support for implementation of the corrective actions.

The Independent Oversight team found that members of the EMWG feel empowered and proud of the accomplishments that they have achieved to date. Among the accomplishments cited are the breaking down of most resistance to a Reservation-wide emergency plan, the decision to have a single Reservation-wide computer-assisted protective action recommendation system, timely completion of most hazards assessments, timely completion of draft site-specific annexes to the Reservation-wide plan, and completion of a draft revised Reservation-wide emergency plan for review. The major concern expressed about the EMWG is that its success is very dependent upon its dynamic leadership and the support of top OR management. A formal charter is needed to institutionalize the group since changes in its leadership or in the support it receives could result in a loss of momentum over the long term in improving emergency management at all sites on the Oak Ridge Reservation.



The new OR Manager has been proactive in reinforcing the OR commitment to meeting departmental emergency management requirements.

OR management has shown strong support for improving emergency management. The EMWG chairman has access to the OR Deputy Manager, who has been helpful in resolving conflicts and difficulties among the various DOE sites on the Oak Ridge Reservation. The new OR Manager has shown strong support for the improvements both in her letters and other actions taken, including her public recognition of the accomplishments and importance of the EMWG and her requiring reports on progress and demanding accountability of her staff for meeting action plan requirements. She has been proactive in reinforcing the OR commitment to achieve compliance with Departmental emergency management requirements and to formalize the process of improvements. Her letter to the DOE Headquarters Office of Science stating that ORNL and other Reservation facilities would not be in compliance with the DOE Order 151.1 requirements by the September 30, 1999, deadline served to document the commitments made for improvement and the compensatory actions to be taken. While the Independent Oversight team has some concerns with the technical basis and depth of the identified, compensatory actions identified, the process that OR has undertaken to formalize and document actions and schedules shows progress in improving emergency management on the Oak Ridge Reservation.

The DOE ORNL Site Manager has also shown strong support and has been helpful in coordinating efforts between DOE and ORNL to allow rapid improvements in emergency management at ORNL. The Independent Oversight team found that Lockheed Martin Energy Research and Bechtel-Jacobs Company management have accepted the responsibility for making the required improvements at ORNL and have been able to accomplish many of the required actions on time. The necessary funding priorities have been established to enable ORNL to complete facility hazards surveys and hazards assessments. This took cooperation among the DOE Office of Science, the DOE Office of Environmental Management, OR, and ORNL. Historically, there has been some uncertainty about Headquarters' responsibility for emergency management at this multitask laboratory; this responsibility is now to be defined by a memorandum of understanding required by the Secretary of Energy to define lead program secretarial officer and cognizant secretarial office responsibilities.

Lockheed Martin Energy Research has worked well with Bechtel-Jacobs Company on the ORNL site to establish a team approach to emergency management. Thus, through the strong management support of DOE as well as the contractors at ORNL, a substantial momentum for improvement has developed over the last few months. However, as with the EMWG, most people who were interviewed expressed concern that if management attention is distracted from this work by other events at the Oak Ridge Reservation, this momentum could be lost over the long term.



Neither DOE nor ORNL line management has clearly established or communicated long-term plans for improving the emergency management program.

The Independent Oversight team found that neither DOE nor ORNL line management has clearly established and communicated long-term plans to sustain continuous improvement and accountability for emergency management program effectiveness beyond near-term efforts to achieve compliance with DOE Order 151.1 requirements. Most of the effort at this time is focused on meeting the very near-term goals of the August 1999 OR Emergency Management Action Plan. DOE and contractor personnel are aware that long-term corrective actions are required; however, line

management has not formally defined and communicated the actions that are to be taken beyond the current efforts of the OR Emergency Management Action Plan. This lack of definition has resulted in a lack of focus and commitment on achieving a high, long-term level of emergency management proficiency.

There is a common understanding among DOE and ORNL staff that the EMWG cannot sustain its current level of effort and staff over the long-term; thus, there is some confusion regarding how emergency management improvements will be managed after the near-term actions are completed. Different ideas and possible organizational structures for long-term management were discussed with Independent Oversight team members, but decisions on this subject appear to be lacking. The result is uncertainty among both OR and ORNL staff about the nature of the long-term management structure and style of management for this effort. Such uncertainty could impact the sustainability of the current efforts.

FINDING: Line management has not established long-term plans to sustain emergency management program effectiveness, including an integrated self-assessment program with clearly defined organizational roles, responsibilities, and accountability mechanisms, beyond near-term efforts to achieve compliance with DOE Order 151.1 requirements.



ORNL has yet to perform the selfassessments that were outlined in the 1998 Reservation-wide emergency plan.

The Reservation-wide emergency plan approved in 1998 calls for self-assessments of the emergency plan, implementing procedures, emergency response training, emergency facilities, emergency equipment and supplies, and interfaces with offsite state and local agencies. Independent Oversight found that neither these self-assessments nor self-assessments of the drill and exercise program have been performed as required. Members of the EMWG have been considering how best to conduct these self-assessments and described a possible three-tiered concept calling for Reservation-wide self-assessments conducted by the OR

Emergency Management Program Office, sitewide self-assessments conducted by each DOE site office, and site contractor self-assessments conducted by each contractor. It should be noted that as part of the August 1999 OR Emergency Management Action Plan, several special self-assessments have been completed to determine what actions are necessary to come into compliance with DOE Order 151.1. Leadership from the Office of Science is needed to establish line management roles, responsibilities, authorities, approach, and organizational accountability for a comprehensive, integrated approach to self-assessment. This is particularly needed at this time as new contractual expectations and requirements are being established at ORNL.

In conclusion, the Independent Oversight team found that, in large measure, the corrective actions and improvements planned and accomplished to date have been very late in coming and have, for the most part, been driven by efforts of the new OR Manager in response to findings of external reviews. The initiatives taken by the new OR Manager to substantially improve the emergency management program at the Oak Ridge Reservation over the near-term represent a significant positive development. Recent actions of OR management are commendable and can lead to an effective emergency management program if there is long-term OR follow-up and continued attention. Line management follow-up at all organizational levels is needed to determine whether the positive efforts of DOE and ORNL management truly represent a permanent change in site philosophy and support. In addition, follow-up is needed in the areas of previously defined corrective actions, newly identified findings related to self-assessments, long-term planning and management, consistency and adequacy of implementation of the Reservation-wide emergency plan at each Reservation site, and the accomplishment of EMWG Action Plan requirements. Finally, it is noted that the original 19 ORNL corrective action items currently contained in the Department's Corrective Action Tracking System have not been updated to reflect changes in line management expectations embodied in the 1999 OR Emergency Management Action Plan. Failure to maintain the Department's tracking system may result in confusion in future efforts to evaluate progress in addressing issues.

Rating: Marginal



Hazards Surveys and Hazards Assessments



It is unclear what standard the ORNL Site Office will use as a baseline reference during the upcoming hazards assessment review and approval process.

The 1998 emergency management evaluation at ORNL facilities concluded that hazards assessments did not adequately support the analysis of potential accidents and the evaluation of potential event consequences. Contributing to this condition was the lack of a management system for implementing effective guidance for the assessment process. In response, the OR Emergency Management Program Office issued the Standard for Development and Maintenance of the Emergency Management Hazards Assessment Process in March 1999. This standard established requirements and methods for developing and maintaining hazards surveys and assessments for all contractors on the Oak Ridge Reservation, and it reflects requirements of DOE Order 151.1 and the associated emergency management guide. When fully implemented across the Reservation, it will provide a sound basis for structuring all elements of the Oak Ridge Reservation emergency management program. However, there is some confusion regarding the current status of the issued standard. Although the standard itself requires its use by all site contractors, it is unclear what document the ORNL Site Office will use as the baseline reference during the upcoming hazards assessment review and approval process. The hazards assessment standard could be enhanced with additional attributes, such as specific requirements for completing assessment of transportation activities. Additionally, this standard is non-conservative in that it only requires quantitative analysis of materials with quantities in excess of the Threshold Planning Quantities identified in the Code of Federal Regulations. Some materials, such as biological hazards, may warrant assessment without regard to threshold planning quantities because of their extremely hazardous nature or because threshold planning quantities are not listed.

Lockheed Martin Energy Research has completed all three hazards surveys to address nuclear and nonnuclear facilities at ORNL and the ORNL facilities at Y-12. Bechtel-Jacobs Company has also completed all three hazards surveys for facilities/activities under their cognizance. Neither Lockheed Martin Energy Research nor Bechtel-Jacobs Company has completed a survey of offsite and onsite transportation activities, nor is the survey scheduled in the corrective action plan. Timely completion of a transportation survey is warranted to provide the basis for determining quantitative hazards assessment requirements.



The Oversight team found that the ORNL hazards survey document was not an effective planning tool for emergency managers and responders.

The team evaluated the ORNL Emergency Management Hazards Survey for M&O Contractor Non-Nuclear Facilities (Rev. 0, August 20, 1999) by comparing the document to the requirements of the hazards assessment standard. Many inconsistencies were noted. Thirty-one facilities contained hazardous material amounts that exceeded threshold planning quantities. However, only a "qualitative" screen was performed in the hazards survey, and no quantitative documentation was provided to justify the conclusions that the hazardous materials were not a concern. Furthermore, qualitative screening criteria were inappropriately applied. For example, the criteria "in use by general public" and "material not hazardous to humans" were used to identify 240,000 pounds of sulfur hexafluoride (SF₆) as a material not requiring quantitative assessment, with no further explanation. SF_c is an asphyxiator and should be quantitatively assessed. Survey tables did not reflect required facility information such as occupancy, presence of classified materials, and emergency conditions that could affect the facility. Consequently, the document was not an effective planning tool for either emergency managers or responders. The survey also did not assign responsibilities for its maintenance and review. The hazard surveys have been submitted to the ORNL Site Office for review and approval. The surveys and assessments are currently being reviewed and commented on.

Similar to the hazards survey review, the team evaluated the *ORNL Emergency Management Hazards Assessment for M&O Contractor Nuclear Facility Building 7920* (Rev. 0, September 20, 1999) and noted both programmatic and technical concerns. For example, a corporate-level mechanism has not been implemented within Lockheed Martin Energy Research

to ensure that emergency planners are notified in advance of significant changes in hazardous materials inventories, processes, and activities at ORNL. As a consequence, some operations may constitute an unanalyzed hazard from an emergency management perspective. This situation is noteworthy since the hazards assessment only requires facilities to perform "regular review – maintain current," an activity that is undefined and therefore inconsistent with the requirements of the hazards assessment standard. An assessment of transportation activities on site or off site has not been performed, and the assessment is not listed for completion in the corrective action plan schedule.



An Assessment of transportation activities has not been performed.

Hazards assessments at ORNL are generally performed by facility staff responsible for preparing safety documentation, such as bases for interim operation and safety analysis reports. Although this arrangement provided facility-specific, knowledgeable personnel, it also introduced unintended limitations that can minimize the utility of the hazards assessment. For example, the Building 7920 assessment is not a standalone document. Numerous assessment paragraphs simply refer the reader/user to applicable paragraphs and pages of the voluminous bases for interim operation and/or safety analysis report, rather than summarizing applicable reference information (as is prescribed by the hazards assessment standard). Consequently, the assessment is not a fully effective planning tool for use by laboratory and city/county/state emergency planners, nor is it a fully effective tool for responders in laboratory emergency response facilities or for the DOE Headquarters emergency operations center during an emergency. Additionally, the full range of highprobability/low-consequence to low-probability/highconsequence events was not recorded and analyzed in the assessment. Although 270 possible accident scenarios (many of low consequence) were identified and addressed in the safety analysis report hazard evaluation process, only a few scenarios were analyzed in the hazards assessment to provide the basis for preparing thresholds and EALs for declaration of Operational Emergencies. More importantly, operational Beyond Design Basis accidents were evaluated in the safety analysis report, including failure of ventilation and the containment off-gas high-efficiency particulate air filters with a simultaneous breach of the hot cell confinement structure. Although the event frequency was postulated as less than 10⁻⁴ per year, the events were dismissed without any consequence assessment analysis. This is inconsistent with the requirements of the hazards assessment standard, which requires Beyond Design Basis accidents to be analyzed even if the frequency is less than 10⁻⁶ per annum. Such analyses provide the foundation for an emergency management response to events beyond the facility design basis.

Several other technical concerns noted in the hazards assessment indicated weaknesses in implementing the associated standard. As an example, the assessment format and arrangement were inconsistent with the format prescribed by the standard. Variation in formats decreases the utility of the hazards assessment for emergency planners and decreases its effectiveness as a response tool. Although the hazards assessment should be the primary tool identifying barriers to potential hazardous material releases and observable indicators of barrier failure to permit emergency planners to prepare classification EALs, the assessment lacked this critical, fundamental information. Furthermore, the terms "Facility Boundary" and "Common (facility) Distance" are not clearly defined and documented as required by the hazards assessment standard. As a result, the site cannot readily classify an event based on exceeding the protective action criteria at specified distances from the facility. Additional items for correction were discussed with ORNL staff.



Inconsistencies between hazards assessments and the associated standard limit their usefulness to emergency planners and responders.

In conclusion, OR has facilitated the preparation of effective hazards surveys and hazards assessments across the Oak Ridge Reservation by issuing a standard for all Reservation contractors. Lockheed Martin Energy Research and Bechtel-Jacobs Company have completed surveys of all of their facilities, and they have identified the emergency management program organizational and contractual facilities that require additional efforts to quantitatively assess the hazards.

This is a key step in establishing the foundation of a comprehensive emergency management program. The initial drafts of the hazards assessments have been completed and are being reviewed at OR, while completion of the remaining assessments is on schedule. However, inconsistencies between the hazards assessments and the associated standard limit their usefulness to emergency planners and responders. Furthermore, the extent to which the issued standard is expected to be used as a true standard is unclear. ORNL and OR have yet to perform a critical review of hazards surveys and assessments to ensure that their technical accuracy and utility are sufficient to form the basis for structuring an effective emergency management system. Management attention is also required to ensure that all appropriate hazards have been assessed and that the hazards assessment documents are kept current.

Rating: Marginal



Emergency Plan Implementing Procedures

The 1998 review of ORNL found that emergency management procedures and the supporting EALs had not been developed or controlled with sufficient rigor to assure effective and accurate identification, classification, notification, and mitigation of accidents. Weaknesses were also observed in the formality of procedure usage and the completeness of the emergency plan implementing procedure (EPIP) set. Although the efforts of the recently formed EMWG are intended to address these deficiencies, little significant progress has been made in upgrading the procedural tools used by ORNL emergency response personnel or in formalizing the use of these tools.



Thirty EPIPs are scheduled to be implemented at ORNL by the end of 1999, but more than half haven't been drafted

The most notable improvement to date in addressing EPIP weaknesses is the establishment of the EMWG in July of 1999 and OR's decision to implement an

emergency management approach wherein most of the EPIPs will apply Reservation-wide, with each site having a relatively small set of site-specific EPIPs. The EMWG has recently defined an appropriate EPIP set, and the 30 EPIPs that directly support the OR and ORNL response to an event at ORNL are to be implemented by the end of 1999. Progress is being made, but considering that more than half of these EPIPs have not yet reached a draft state, this represents an extremely aggressive deadline. Procedures supporting the implementation of various other emergency plan administrative provisions are scheduled to be implemented at the end of the first calendar quarter of 2000.

The relatively short time remaining before the "event-response" EPIPs are scheduled for implementation presents several significant challenges beyond the procedure development effort. The absence of contractor participation on the EMWG, combined with the move to a Reservation-wide approach for most EPIPs, represents a challenge for many of ORNL's emergency response personnel responsible for EPIP implementation during an event. Some ORNL users believe that the Reservation-wide EPIPs will not adequately handle site-specific considerations and requirements and that they may be difficult to implement. This opinion is significant because there is no indication that the EPIP implementation milestone takes into account an EPIP review and comment cycle that would actively involve EPIP users from the sites and stimulate procedure ownership and confidence. Furthermore, a review of two ORNL-specific EPIPs for Operational Emergency notification and protective action decision-making indicates that the current procedure development and review process for laboratory-level implementing procedures lacks rigor. The two procedures that were reviewed were developed before the recent decision to maximize the Reservation-wide approach, and they were supposed to incorporate the major elements of the two associated Reservation-wide EPIPs currently in effect. Neither of the laboratory procedures embraces all of the attributes of the Reservation procedures, and they are in fact inadequate. For example, the ORNL procedure for protective action decision-making does not include the flowcharts for determining onsite and offsite protective actions or the table of initial isolation and protective action distances that are included in the associated Reservation-wide procedure.



A guidance document is needed to promote consistency between Reservation-wide and site-specific EPIPs.

Current plans call for an OR contractor to develop Reservation-wide EPIPs, using as a model similar procedures from another site within the complex that has a strong emergency management program. However, to date there have been no discussions regarding development of a procedure-writer's guidance document to promote consistency between the Reservation-wide and site-specific EPIPs, and to ensure that the EPIPs are verified as accurate and validated as usable. Guidance to writers is particularly important given the format of the existing Reservationwide EPIPs. While they contain the appropriate content, a review of two of these procedures indicated that they are not structured in a manner that facilitates implementation in an urgent, high-stress environment and were not subjected to verification and validation.

Beyond the Reservation-wide response, sitespecific considerations require tailored emergency response-related procedures, such as EALs. A set of generic EALs was recently added to the existing ORNL facility-specific EALs to address such events as airborne release of hazardous material during transportation, discretionary judgment situations, and natural phenomena. However, a review of these EALs identified a number of weaknesses, including the inability to use them when field monitoring data is lacking, the lack of discretionary EALs that are based on safety system status, and the absence of thresholds in the transportation EALs for Operational Emergencies not requiring classification. Furthermore, there is still no specific implementing procedure for the EALs. Thus, no procedure guidance exists for the ORNL Laboratory Shift Superintendent (LSS) for certain conditions, such as multiple events or implementing the Oak Ridge Reservation Emergency Plan requirement for a maximum 15-minute span between occurrence of an event requiring classification and completion of the classification.



The follow-up review found that significant weaknesses remain in disciplined procedure use, which requires immediate management attention.

This follow-up review indicates that significant weaknesses remain in disciplined procedure use.

Despite the observations during the 1998 review at ORNL regarding management's philosophy that procedures were only guides and the negative impact of that philosophy on LSS performance at the time, line management has taken virtually no action to effectively address this concern. ORNL-specific corrective actions were limited to modifying or developing four procedures for use by the LSS and implementing "structured training in conduct of operations for the LSS organization." These corrective actions were poorly implemented and did not adequately address the observed deficiences in emergency responder performance. Performance weaknesses were again evident during tabletop exercises conducted as part of this Independent Oversight evaluation with three teams of qualified LSSs and their assistants. EPIP usage by the LSSs in response to these scenarios was generally undisciplined, resulting in several critical response functions not being performed or not being timely. For example, one LSS delayed the scene assessment for an excessive period and another did not issue protective action orders until laboratory personnel reported adverse health effects from the postulated release. Two LSSs did not implement prompt notifications to offsite agencies for operational emergencies not requiring further classification, and none of the teams used the Reservation-wide EPIP on protective actions to formulate their decisions. In addition, there is still no formal policy document regarding management's expectations for EPIP usage.

FINDING: OR and ORNL line management have not identified and implemented the corrective actions necessary to ensure that emergency plan implementing procedures are prepared, verified to be accurate, validated to be usable, and used in a disciplined and accurate manner in accordance with DOE Order 151.1.

In conclusion, some progress has been made to establish a set of EPIPs that provides the guidance necessary for timely and accurate event classification, notification, and protective action formulation. This progress has been made through the leadership of the EMWG in identifying the required procedure scope and distribution between Reservation-wide and site-specific coverage. However, ORNL is not using the Reservation-wide procedures. There are significant challenges in meeting the December 1999 deadline, including important considerations in the areas of users' "buy-in" to the Reservation-wide EPIP and EPIP

usability. Of more immediate concern to the Independent Oversight team are the performance weaknesses on the part of the LSSs in their emergency response role, which can be attributed in part to the continued absence of a formal, clearly defined management policy that promotes the disciplined use of EPIPs by emergency responders. The apparent lack of progress since similar weaknesses were identified during the 1998 review requires immediate attention by line management to provide additional, interim assurance that emergency response personnel will respond appropriately to a site event.

Rating: Unsatisfactory



Training Program

The 1998 review at ORNL found that a structured emergency management training program had not yet been implemented at ORNL. Few training courses had formal lesson plans, and most training was not adequately documented. OR personnel with emergency response duties were not receiving the required training, and most had not participated in drills or exercises within the past year. As in the area of procedures, progress is being made to address these deficiencies through recent initiatives of a programmatic nature. However, little improvement is evident in the training being provided to emergency response personnel at the LSS level and above to maintain or improve their proficiency.



Past discussions on whether to implement a Reservation-wide or laboratory-specific approach to emergency management slowed the implementation of a training program.

Efforts to implement a structured emergency management training program are now under the leadership of the EMWG. However, actual progress to date has been slow because the training implementation details were, until recently, contingent on the outcome of discussions on whether to implement a Reservation-wide or a laboratory-specific approach to emergency management. This decision was made within the past several months. Consequently, training

progress since the 1998 review, as measured by training actually provided to ORNL and OR emergency response personnel at the LSS level and above (and for the OR equivalents), is limited to the development and delivery of training and training materials associated with completing specified "interim" training requirements. Because the 1998 review identified that the emergency management training program was not comprehensive, formalized, or current, OR and ORNL identified interim training requirements for both Federal employees and contractors. Interim training was intended as a compensatory measure to strengthen the knowledge base of OR and ORNL emergency response personnel until a full qualification program could be established to provide a reasonable expectation that emergency response personnel could adequately respond to an Operational Emergency. Nearly all of the affected Federal emergency response personnel have met these interim requirements, and individuals are not placed on the duty roster until they complete the requirements. ORNL emergency response personnel are also making satisfactory progress toward the December 17, 1999, completion requirement. However, as mentioned in the previous section, none of the training for the LSSs since the 1998 review has improved performance, partly because of the lack of guidance and training provided to the LSSs on implementing the Reservation-wide EPIPs. There is confusion within the ORNL LSS organization regarding the usage and accuracy of the Reservation-wide EPIPs for notification and protective action decision-making. As a result, these EPIPs would probably not be used during an actual Operational Emergency, as was illustrated during the tabletop exercises conducted by the Independent Oversight team.

The most significant positive development in emergency management training is formulation of a training subcommittee of the EMWG to finalize qualification requirements and the training curriculum. Membership includes representatives from OR, the three DOE site offices, and the various site contractors. Its unofficial charter is to promote consistency in the OR and contractor emergency response organization qualification approach and to avoid duplication of effort, which is particularly important because of the large amount of work that must be done before the December 1999 deadline. Near-term objectives include identifying position-specific training topics for contractor emergency responders, requirements for material development, and methods of delivery. Progress is also being made on developing formal qualification packages for all Federal emergency response positions. These will define the position prerequisites, experience, initial and refresher training, and drill/exercise participation requirements for an individual to be fully qualified to fill the associated emergency response position. Current plans call for using a contractor to develop training associated with Reservation-wide topics in emergency management, including Reservation-wide EPIPs, and ORNL will be tasked with developing training for site-specific topics. The subcommittee's approach is appropriately focused on meeting the end-of-year deadlines and makes maximum use of existing applicable training materials, regardless of site origin, with the intention of upgrading and refining those materials over the coming year.



The impending deadlines for completing and documenting a formal training program for emergency response personnel pose a significant challenge for OR and ORNI.

As with procedures, the impending deadlines for completing and documenting a formal training program for all emergency response personnel involve significant challenges for OR and ORNL. The ORNL Site Office has halted the development of emergency response organization training material by the ORNL emergency management organization pending the identification of required training topics and the organization responsible for developing the associated training material. Putting these activities on hold is understandable, given the desire to avoid potentially wasted and duplicative efforts and the uncertainties regarding the nature, content, and delivery schedule of the material to be developed by the outside training contractor. However, these same uncertainties may pose a significant, last-minute challenge to the ORNL emergency management organization's ability to meet the December 17, 1999, deadline for completing training and qualification.

Another potentially significant impediment to meeting the deadline is the EPIP implementation deadline, which has an inherent training element. An accepted practice of disciplined operations is that personnel who will be expected to use a new procedure must be trained in its use before its official implementation date. For OR and ORNL emergency response personnel, the new EPIP set will have to be fully developed (or nearly so) to provide effective

training, which will need to be completed before the new EPIP set can be officially implemented. However, there is no evidence of any development and communication of interim milestones to establish and control the sequencing of the EPIP development, validation, training, and implementation activities.

In conclusion, OR and ORNL, through the recent efforts of the EMWG, are developing a program to have a fully trained and qualified emergency response organization in place by the December 1999 deadline. Ongoing initiatives are building an appropriate foundation for an effective emergency management training and qualification program. Progress has been noted in the OR emergency response organization. However, training provided to certain ORNL emergency response personnel since the 1998 review has not resulted in meaningful performance improvements, as indicated by the tabletop performance evaluations conducted as part of the current review. Significant challenges remain for implementing a comprehensive program within the allotted time, particularly in light of the many training material development uncertainties and the impact of the EPIP implementation effort on the training workload.

Rating: Marginal



Drill and Exercise Programs

The 1998 Independent Oversight review of ORNL noted several deficiencies in the drill and exercise program, including: lack of formal procedures to provide programmatic controls for drills and exercises, drill and exercise schedules not being tracked, and a lack of formality in how ORNL applies results from drills and exercises to program improvement. Results of this follow-up review found that ORNL has taken limited actions to correct program shortcomings identified in the 1998 Office of Independent Oversight review.

ORNL is now working toward a deadline of December 31, 1999, to define, formalize, and implement a drill and exercise program. The shift of this deadline from the previous commitment of January 29, 1999, reflects the slow pace of corrective action implementation. ORNL has developed a programmatic description specific to drills and exercises as two sections within their site-specific annex to the Oak Ridge Reservation Emergency Plan. These sections discuss

ORNL's expectations for a drill and exercise program and are intended as general guidance. In most cases, these sections reflect the generic expectations identified as part of the Oak Ridge Reservation-Wide Emergency Plan, Revision 0, April 1998, and were submitted to OR for review in August 1999. ORNL has received comments on their initial input; however, further revisions are awaiting clarification of program content from the OR EMWG. Until this classification is received, ORNL is taking no action to develop guidance documents specific to the formal drill and exercise program.

ORNL developed a drill and exercise schedule for calendar year 1999. The drills included a laboratorywide building evacuation to assembly points, public address announcements to shelter-in-place, and numerous public address system function tests and outdoor public warning chime tests. In addition, preparation for Year 2000 (Y2K) contingency for the date 9/9/99 was conducted. The exercise package conducted for an exercise at the 3039 Stack Facility in July 1999 showed that it contained elements essential for the planning and conduct of such an exercise. A tabletop exercise was conducted as part of the preparation prior to the exercise. For this review, the Independent Oversight team focused on the output from the Stack Facility exercise in the form of deficiencies and associated corrective actions. This focus was selected to determine the adequacy of feedback and continuous improvement versus adequacy of all elements included in the exercise package.



Drill and exercise activities are not well integrated into the emergency management program.

While activity is present in the drill and exercise program, deficiencies identified in the 1998 review still remain. The drill program does not focus on using a graded approach based on the hazards at specific facilities. Facility managers conduct drills at their facilities, but these are not associated with the emergency management drill and exercise program and have only superficial involvement with some members of the ORNL emergency response organization, such as the LSSs and the Fire Department. There has been no drilling of functional elements of the emergency response organization such as the technical support

center cadre, or LSSs utilizing simulation cells or other appropriate drill methods. As such, the ORNL emergency management program has, at times, been ad-hoc in its approach and has not taken advantage of opportunities to fully integrate all elements of the emergency response organization into its drill program.

Documentation of results from drills and exercises, correction of identified deficiencies, and application of results to affect program improvement have not shown signs of improvement. Deficiencies identified during the 1998 OR/ORNL full-scale emergency exercise are not being formally tracked, nor is there documentation available to support closure of deficiencies. The program director was familiar with actions taken to correct most deficiencies from this exercise, but the process lacks formal mechanisms to communicate the outcome of the exercises to management. A review of the exercise package for the 3039 Stack Facility exercise in July 1999 found handwritten evaluator critique forms; however, there has not been a formal method of including deficiencies in a system that can be further analyzed, trended, or tracked to ensure that closure is adequate. The program director indicated that deficiencies had been addressed, but there is no way to determine the adequacy of such actions.

Local emergency supervisors utilize an electronic form on the ORNL emergency management Web page for reporting the results of facility drills. Once completed, these forms are electronically routed to the LSS's office for inclusion in a copy of the facility emergency plan that is maintained in the office. The Independent Oversight team reviewed a selection of these forms for the laboratory-wide building evacuation drill conducted on May 10, 1999. Some of these forms contained noted deficiencies. Some local emergency supervisors elected not to perform a critique, and one had not completed the form. While these forms can provide essential information on the performance of emergency response organization elements, they are not formally reviewed within the emergency management program or included in a formal system for trending, analysis, and program improvement. The electronic form on the Web page provides a way to collect and analyze such data to improve overall program performance, but this opportunity is not being taken advantage of.

In conclusion, little progress has been made in the development of a formal drill and exercise program at ORNL since the 1998 Independent Oversight review. Current activities at ORNL are not comprehensive or

integrated, nor is information gathered and used effectively. While the outline for the requirements of the site-specific Emergency Management Plan Annex is an initial step, the mechanisms for developing feedback and continuous improvement have not been developed to institutionalize the drill and exercise program. As presently structured, the drill program at ORNL is not comprehensive in its approach and does

not ensure that shortcomings in the emergency response organization will be identified, communicated to management, and effectively corrected. It was noted that the OR EMWG has yet to focus on this element of the emergency management program.

Rating: Marginal



Conclusions and Overall Rating

This section presents an overall perspective and rating on the current state of the ORNL site emergency management program.

Progress in implementing actions to improve the emergency management program at ORNL since 1998 has been slow. The enhanced management commitment and actions over the past few months are now driving improvements in the Reservation-wide and ORNL emergency management programs. In the next year, continued leadership of transition planning activities is needed to implement new standards, programs, and procedures to meet established deadlines. OR and ORNL management clearly recognize that current systems are neither fully implemented nor compliant with Departmental requirements. Recent changes are being driven from the senior management level down through the organization but are not yet reflected in performance improvements at the emergency responder level. Weaknesses remain in draft hazards assessment documents and new emergency response implementing procedures. The disciplined use of these tools is not being reinforced by management and supported through training. Finally, the drill and exercise program is not supporting continuous improvement.

The overall rating of Marginal and the individual element ratings suggest an emergency management program in transition. The rating of Unsatisfactory in EPIPs reflects the lack of progress in the area of procedure quality and usage since a Marginal rating in the "Plans and Procedures" area was assigned subsequent to the 1998 review. The Independent Oversight team attributes this situation to an initial set of poorly defined corrective actions and unclear communication of expectations regarding procedure usage, as evidenced by the LSSs' undisciplined use of procedures during tabletop exercises. Weaknesses in procedure usage and content contributed in large part to the observed LSS performance deficiencies. Nonetheless, on balance, this review found that senior management has recently established the required commitment, support, and infrastructure to facilitate improvement. The efforts of OR and ORNL management, if sustained and fully implemented, can provide reasonable assurance that the program will satisfy the Department's requirements and that all of the site's emergency responders will be ready to respond promptly and effectively to an emergency.

Overall Rating: Marginal



Ratings by Report Element		
Feedback and Continuous Improvement Process	Marginal	
Hazards Surveys and Hazard Assessments	Marginal	
Emergency Plan Implementing Procedures	Unsatisfactory	
Training Programs	Marginal	
Drill and Exercise Program	Marginal	

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Opportunities for Improvement

The follow-up review conducted by the Independent Oversight team identified several opportunities for improvement. These potential enhancements are not intended to be prescriptive. Rather, they are intended to be reviewed and evaluated by the responsible DOE and contractor line managers and prioritized and modified as appropriate, in accordance with site-specific programmatic and emergency management objectives.

- 1. The Office of Science, as lead program secretarial officer, should take a more direct and visible leadership role in ensuring that the implementation of the Oak Ridge Reservation Emergency Plan is consistent among the various sites and contractors.
- Roles, responsibilities, authorities and accountabilities for the emergency management program at the Oak Ridge Reservation for cognizant secretarial officers and OR, and specifically at the multi-program ORNL, should be clearly defined in memoranda of understanding.
- Ownership in the Office of Science for infrastructure, including emergency management, should be established in line management responsibilities, as has been recently done for the oversight of infrastructure activities at Brookhaven National Laboratory.
- 2. OR should develop a long-term management plan for implementation, management, and oversight of the emergency program and the Oak Ridge Reservation Emergency Plan to assure that the current momentum will not be lost and that expectations will be institutionalized.
- Consistent requirements and expectations should be established within existing and new contractual requirements and associated

- performance metrics across the Oak Ridge Reservation.
- The role of the EMWG should be formalized and the membership expanded to include contractor line management representation. The EMWG should serve as a steering committee to facilitate Reservation-wide implementation consistency and to define appropriate boundaries where site-specific implementation considerations may need to be accommodated.
- OR and ORNL senior management should enhance organizational and individual accountability processes to better ensure that emergency response organization members' participation in training, drills, and exercises receives a high level of management support and attention.
- Line management should develop and implement an integrated self-assessment program covering all aspects of emergency management. This program should comprehensively consider the scope and interfaces of each organizational level, from both a Reservation-wide and a site-specific scope, to ensure consistency in expectations, maximize efficiency, and communicate lessons learned.
- 3. Existing ORNL corrective action plans currently in the Department's Corrective Action Tracking System should be updated to reflect the ORR Emergency Management Action Plan to more clearly establish implementation schedules, requirements, and expectations.
- 4. OR and ORNL should better communicate policy expectations for the disciplined approach to the use of emergency plan implementing procedures by addressing ORNL cultural boundaries.

- In the very near term, ORNL line management should institutionalize expectations for the disciplined approach to the use of EPIPs, formally communicate these expectations to emergency responders, and verify that affected emergency responders clearly understand the expected approach to using existing ORNL-specific and Reservation-wide EPIPs.
- In the near term, ORNL line management should regularly conduct tabletop exercises to verify that

- LSSs use EPIPs appropriately to categorize and classify events, perform required notifications, and develop and implement protective actions.
- In the long term, site user's ownership and confidence in these procedures should be fostered through verification, validation, and training program input that is responsive to user concerns.

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APPENDIX A

FINDINGS FOR CORRECTIVE ACTION AND FOLLOW-UP

This appendix summarizes the significant findings identified during the Office of Independent Oversight and Performance Assurance follow-up review of the Oak Ridge National Laboratory emergency management program. The findings identified in this appendix will be formally tracked in accordance with the Protocols for Responding to Office of Independent Oversight and Performance Assurance Appraisal Reports (August 1999) and will

require a formal corrective action plan. The DOE Office of Science, Oak Ridge Operations Office, ORNL site office, and ORNL need to specifically address these findings in the corrective action plan. Other weaknesses and/or deficiencies identified in this report should be addressed by line management but need not be included in the formal corrective action plan.

FINDING STATEMENT	REFER TO PAGES:
1. Line management has not established long-term plans to sustain emergency management program effectiveness, including an integrated self-assessment program with clearly defined organizational roles, responsibilities, and accountability mechanisms, beyond near-term efforts to achieve compliance with DOE Order 151.1 requirements.	7-8
2. OR and ORNL line management have not identified and implemented the corrective actions necessary to ensure that emergency plan implementing procedures are prepared, verified to be accurate, validated to be usable, and used in a disciplined and accurate manner in accordance with DOE Order 151.1	11-12

OPEN LEGACY ISSUE

OR and ORNL have not implemented an effective emergency management program; significant weaknesses are evident in hazards assessments, EALs, classification, protective actions, emergency procedures, training, implementation of the Oak Ridge Reservation Emergency Plan, feedback mechanisms, drills, and field monitoring.

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APPENDIX B

EVALUATION PROCESS AND TEAM COMPOSITION

The evaluation was conducted according to formal protocols and procedures, including an Appraisal Process Guide, which provides the general procedures used by the Independent Oversight program for conducting inspections and reviews, and the Oak Ridge National Laboratory Emergency Management Program Plan, which outlines the scope and conduct of the process. The evaluation was conducted under the direction of the Secretary of Energy's Office of Independent Oversight and Performance Assurance. Planning discussions were conducted to ensure that all team members were informed of the review objectives, procedures, and methods.

Explanation of Rating System

The Office of Independent Oversight and Performance Assurance assigns an overall rating to the emergency response exercise; ratings are also assigned to the supporting elements of a facility's emergency management program. The rating process involves the critical consideration of all evaluation results, particularly identified strengths and weaknesses. In the case of weaknesses, the importance and impact of those conditions is analyzed both individually and collectively, and balanced against any strengths and mitigating factors to determine their impact on the overall goal of protection of site workers and the public. The Office of Independent Oversight and Performance Assurance uses three rating categories—Satisfactory, Marginal, and Unsatisfactory—which are also depicted by colors as Green, Yellow, and Red, respectively.



Satisfactory (Green): An overall rating of *Satisfactory* is assigned when the emergency management program being evaluated provides reasonable assurance that all of the site's emergency responders are ready to respond promptly and effectively to an emergency event or condition.

An emergency management element being evaluated would normally be rated Satisfactory if the emergency management function is effectively implemented. An element would also normally be rated as Satisfactory if, for any applicable standards that are not met, other compensatory factors exist that provide equivalent protection to workers and the public, or the impact is minimal and does not significantly degrade the response.



Marginal (Yellow): An overall rating of *Marginal* is assigned when the emergency management program being evaluated provides questionable assurance that site workers and the public can be protected following an emergency event or condition.

An emergency management element being evaluated would normally be rated Marginal if one or more applicable standards are not met and are only partially compensated for by other measures, and the resulting deficiencies in the emergency management function degrade the ability of the emergency responders to protect site workers and the public.



Unsatisfactory (Red): An overall rating of *Unsatisfactory* is assigned when the emergency management program being evaluated does not provide adequate assurance that site workers and the public can be protected following an emergency event or condition.

An emergency management element being evaluated would normally be rated Unsatisfactory if one or more applicable standards are not met, there are no compensating factors, and the resulting deficiencies in the emergency management function seriously degrade the ability of the emergency responders to protect site workers and the public.

Team Composition

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